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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



January 29, 1938

A Home For Cyclops

See Page 69

A SCIENCE SERVICE PUBLICATION

Do You Know?

Some of the newest electric kitchen stoves have cigarette lighters.

Egypt is seeking new ways to irrigate arid land, to increase its farming area.

Hot springs are found in many countries; but the particular type of hot spring known as a geyser occurs only where volcanoes have been active at some time.

Incas of Peru could send messages from Quito to Cuzco—over a thousand miles—in a week, by their system of runners, relaying the message along the way.

In general, if you dig into the earth's crust, you find it one degree hotter each 56 feet; but in Yellowstone Park's geyser area the heat increases one degree almost every foot.

Metal flooring with small monel disks spot-welded on it is a new safety device for kitchens on ships and trains, and for factory floors likely to become wet and slippery.

A goldfish hatchery in Indiana sends its goldfish to New York in a truck equipped with a special engine, so that fresh air is forced constantly through the water in the big truck tank.

The biggest known iron meteorite was found in southwest Africa and weighs some 50 to 70 tons; but there are reports, not yet authenticated, of an iron mass in western Africa so big that it might weigh over a million tons.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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A Hungarian doctor is experimenting with hypnotizing lions and other animals, to aid zoo veterinarians in treating sick or injured animals.

Deer fed by hand-outs from summer visitors, in national parks, sometimes become pauperized and cannot fend for themselves when winter comes.

Plant scientists are still hoping to produce the "perfect" potato—a variety that will combine quality, strong resistance to disease, and large yield.

Norway has two official languages: the *riksmaal*, used for centuries in books and cultured speech; and the *landsmaal*, the homely speech of rural districts.

SCIENCE NEWS LETTER

Vol. 33 JANUARY 29, 1938 No. 5

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—\$5.00 a year; two years \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at the reduced price of \$3 per year. Applications for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A.A.A.S., Smithsonian Institution Building, Washington, D. C.

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Cable address: Scienservc, Washington.

Entered as second class matter at the post-office at Washington, D. C., under the act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature and in the Engineering Index.

Advertising rates on application. Member Audit Bureau of Circulations.

SCIENCE SERVICE is the Institution for the Popularization of Science organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

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PUBLIC HEALTH

6,000,000 Persons in U. S. Are Sick Every Day in Winter

Colds, Influenza, Pneumonia, and Related Diseases Responsible for 25 Per Cent of Total Disabilities

EVERY day throughout the winter 6,000,000 persons in the United States are too sick to work, attend school or pursue their other usual activities. This estimate of the amount of illness in the country is based on results of the National Health Survey which the U. S. Public Health Service has been making.

About 2,500,000 of the 6,000,000 on the nation's daily sick list are suffering from chronic disease such as rheumatism, diseases of the heart and blood vessels, hardening of the arteries, nephritis, cancer and non-malignant tumors, diabetes, asthma, tuberculosis, ulcer of the stomach, gall bladder diseases, nervous diseases and permanent impairments resulting from previous illness or accident.

Colds, influenza, pneumonia and like diseases were the cause of illness in 1,500,000 of the 6,000,000. This is because the survey was made in winter when these diseases are most prevalent.

About half a million were on the sick list because of accidents and another half million suffered from acute infectious illnesses or other acute illnesses such as appendicitis.

The Healthiest Age

From 15 to 24 years is the healthiest age, according to this survey, the proportion of the sick in this age group being only 1 in 40. The highest proportion of sick was in the oldest age group, from 65 years and up. In this group 1 in every 8 were disabled on the day of the survey. Children and adults between 25 and 65 years had about the same proportion of illness.

Illness occurs most often in the lowest income groups, the National Health Survey also shows. During the year of the survey, chronic illness of a week's duration or longer disabled two persons on relief for every one person in the middle and highest income brackets. Families just above the relief level but with incomes less than \$1,000 had less sickness than the relief population but illness rate in this group was 17 per

cent. higher than for the highest income group. Most of this excess was due to the greater frequency of chronic illness.

Illness plays a big part in causing dependency, it appears from that part of the survey which showed how disabling illness incapacitates the wage-earner. In relief families 1 in every 20 family heads was unable to seek work because of disability. In non-relief families with incomes under \$1,000 the number of family heads unable to seek work because of illness was 1 in 33. This figure was 1 in 250 for families in the comfortable income group.

The relief and low-income families not only have more illness but have longer-lasting illnesses. They also get less medical and nursing care than high or comfortable income families.

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PUBLIC HEALTH

Health Fight in Future Must Be Against Adult Ills

THE FIGHT to protect and improve the nation's health must be extended to include attacks on the chronic diseases of adults, such as cancer and heart disease, on poor housing, inadequate nutrition and stream pollution, Surgeon General Thomas Parran, U. S. Public Health Service, indicated in his annual report to Congress.

These four lines of attack plus extension of the health provisions of the Social Security Act, enlargement of the Public Health Service staff and extension of its physical facilities are the recommendations made by Surgeon General Parran to Congress.

The Social Security Act should be extended, he believes, to provide further "cooperation with the states in dealing more effectively with such important problems as syphilis, tuberculosis, cancer, pneumonia and mental disease."

The problem of nutrition involves not only the size of the family income and the amount of food that can be purchased but also the education of the public to select the essentials in food. While

these aspects of the problem may appear largely economic and educational, there is still need for scientific studies to establish better standards for judging how well or ill nourished a person is. At present it is only possible to detect gross deviations from the normal.

Accomplishments of the Public Health Service during the past year were many and varied. The attack on syphilis and gonorrhea continued with increasing momentum. There was no let-up in the fight on other infectious diseases, and new quarantine regulations were put into effect to guard against imported diseases. Distribution of nearly \$8,000,000 to the states under the Social Security Act resulted not only in a vast expansion of local and state health services but in stimulation of states and communities to appropriate almost equal sums of their own for health work.

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ARCHAEOLOGY

12-Foot Wall Surrounded First City of Troy

A 12-FOOT wall, that surrounded the very first city of Troy, has been discovered by a University of Cincinnati expedition, proving that Trojans—even 2,000 years before the Helen episode—never did trust the neighbors.

The high stone wall, with towers at



AN EARLIER HELEN?

Conventionalized outline of a woman's face, found in the ruins of the oldest city of Troy.

the gate, was built by first settlers at Troy, Dr. Carl W. Blegen, field director, announced.

"This first Troy, which began before 3000 B. C. and continued at least no later than 2500 B.C., probably was ruled even then by a king," Dr. Blegen explained.

Troy was rebuilt no less than nine times, as one Troy after another met with some disaster. The seventh city is now believed the one conquered by the ruse of the Trojan Horse, after Greeks vainly besieged its walls for 20 years in order to reclaim stolen Queen Helen, in the twelfth century B.C.

Discovery that Trojans of 3000 to 2500 B.C. had their own distinctive art is also revealed. Dr. Blegen reported finding a heart-shaped human face carved on a slab in a parapet. Pronouncing this sculpture older than any ever found in Greece or Crete, both centers of extensive archaeological investigations, Dr. Blegen said this Trojan art is far from crude. It is as old as Egypt's famous Old Kingdom sculptures, or the great carvings found in Mesopotamian cities. "It is to be inferred," said Dr. Blegen, "that this earliest Troy not only had a king but a royal court, as well, which fostered progress in art."

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A TOWER OF ILIUM

Not "topless" were these first towers of Troy, nor able to boast of highly finished construction; yet for their time they were doubtless formidable. This one guarded a city gate.

AVIATION

Robot Lands Airplanes Without Aid From Pilots

A FORECAST of the future of aviation, when planes will take off and land automatically without human effort, was made at the meetings of the Society of Automotive Engineers by Capt. G. V. Holloman of the U. S. Army Air Corps of Wright Field, Dayton, Ohio.

Under the new system, which the Army has already used on great cross-country flights from the Midwest to New York, to Virginia and then back to Wright Field, the landings of the planes have been entirely without action by the pilot, whose only job is to see that robot mechanisms are operating.

Under the automatic blind landing system a plane has only to get within 20 miles of even a fog-bound airport and it arrives safely at its destination. Four shortwave radio stations, plus the automatic controls in the plane, accomplish the actual landing.

When within 20 miles of the first radio station the pilot levels off the airplane, lowers the landing wheels, adjusts the landing flaps and sets the propellers for their minimum pitch. Then he closes a master switch and can sit back.

The robot controls turn the plane toward the first station of the landing system and adjust the gasoline throttle until the plane is in a glide that will take it down to 1,000 feet above the elevation of the runway of the airport. If this altitude is reached before the plane flies over station No. 1, automatic adjustment levels the plane off into constant altitude flight at 1,000 feet.

When the plane comes over station No. 1 (five miles from the airport) the radio homing device automatically tunes on station No. 2, having a slightly different radio frequency. At the same time the plane is held in level flight at the altitude of 1,000 feet. When the plane passes over station No. 2 (two miles from the airport) the robot controls tune the landing device on station No. 3, which is directly in front of the landing runway at the airport.

At the same time the controls put the plane in a long glide at the rate of 400 feet drop per minute. It holds this glide until an altitude of 200 feet above the elevation of the runway is obtained and then the plane is automatically leveled off at 200 feet altitude.

At station No. 3 the robot tunes the controls on station No. 4, which is at the opposite end of the airport's runway and thus fixes the line on which the plane will land. At the same time the plane is put into its "let down" glide—as pilots call it—and again drops down at a rate of 400 feet per minute until it touches the ground.

At the instant of contact with the ground the robot controls push in the throttle and cut off the gasoline supply and, at the same time, operate gently the brakes on the wheels to bring the plane to a stop.

Capt. Holloman adds:

"Now that automatic landing is an accomplished fact, it is well within the realm of reason to visualize an airplane taking off from an airdrome, flying to

its destination, and landing, the whole being accomplished completely automatically, thereby relieving the flight crew of all duties other than observing the instruments to see that the equipment is functioning properly."

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AVIATION

"Flight Strips" Proposed To Aid Distressed Planes

DESPERATE hunts for landing fields, with the gas getting low and the fog closing in, may be a thing of the past for airline pilots, if the scheme proposed to the 35th annual convention of the American Road Builders Association by Lt.-Col. Stedman S. Hanks is adopted. Instead of cruising around hunting for a place to land, pilots of the future will find a highway and set their planes down on "flight strips" built beside the main roads by the highway departments.

Proposed not only as emergency landing fields, but for the use of private pilots, these paved strips beside main highways, at least 200 feet wide and 1800 feet long, built and maintained by highway engineers, on state-owned land, may also be used as way-stations, from

which airmail and air freight may be picked up by arrangement.

Citing their possible convenience, Col. Hanks quotes a possible conversation of the future, between the pilot of the Bangor-Boston airmail plane and the Boston airport. The pilot has noted fog rolling in from the sea, and has been told that Boston is completely blanketed, "zero-zero" and will be for eight hours more.

Boston tells him, "Not a chance, Bob. Work into Boston as close as you can, then set your plane down on a flight strip. We'll send out a mail truck to the flight strip and pick up the mail."

Already, uniform enabling legislation has been drawn up, and is in the hands of state governors for consideration. Flight strips may range from 200 to 740 feet wide and from 1800 to 5000 feet long, depending on the type of aircraft they are designed to accommodate.

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ARCHAEOLOGY

Indians Had Syphilis— Along White Man's Trail

SYPHILIS, disease now nationally fought in America, apparently afflicted almost half the Indians in some communities along the Potomac River.

Displaying Indian bones marred by disease, Dr. T. D. Stewart of the U. S. National Museum raised the question: Where did syphilis come from?

Prehistoric America has generally been blamed for giving the world this serious malady, Dr. Stewart told the Anthropological Society of Washington. Recent discoveries in Virginia and Maryland warrant re-opening the question, and may lead to the opposite verdict, that white men from Europe brought syphilis to America.

Possibility that the Maryland and Virginia Indians caught their disease from white men of Jamestown or other explorers or colonists is pointed out by Dr. Stewart, who finds particularly significant the spreading of the disease through so many Indians in one group. This is the way the malady would spread, he explains, and it is curious that supposedly very ancient cases of syphilis in America have been single skeletons, or Indians of uncertain antiquity.

Indian bones marked by ravages of syphilis have a characteristic spongy surface, which Dr. Stewart says was caused by inflammation of the covering membrane of the bone during the afflicted Indian's lifetime.

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ASTRONOMY

Dome for 200-Inch Telescope Is Now Nearing Completion

**Mt. Palomar Observatory Structure Is Scheduled for
Finishing on February 1; Instrument Under Construction**

By DR. R. M. LANGER

See Front Cover

THE DOME for the great 200-inch telescope on Mt. Palomar is practically finished structurally and California Institute of Technology engineers can now breathe easier while completion and installation of equipment takes place under its shelter during the next couple of years. By February 1 the dome itself will be complete.

The external shell is still to be painted outside and in with aluminum paint, miles of wiring for electrical circuits are still to be put into place and of course the great telescope itself is far from completion.

Economical in size for the giant telescope it is to house, the dome covers about half an acre and is 137 feet in diameter. Above a cylinder seventy feet tall is a slotted hemisphere through which the telescope will look out at any angle with the horizon.

The upper part, including the hemisphere and twenty-seven feet of the cylinder below it, can be rotated to any direction of the compass so that the instrument can see through the slot any part of the sky available in these latitudes.

Trucks Carry Dome

The fixed part of the dome is devoted to offices, laboratories, storage space and photography rooms. On top of the thirty-foot outer wall is a circular track on which the movable upper portion of the dome rolls on thirty-two four-wheeled trucks, each carrying four heavy springs wound with $1\frac{1}{2}$ inch steel rods.

The room within this moving structure is solely for telescopic observation. There are no appendages or supports to impair the clearance of the telescope tube no matter which way it points. The vault is about ninety feet high from the floor of the observation room to the center of the ceiling. Visitors will not be admitted into this room at all but will have access during special hours to a gallery walled off and insulated from the main observing room.

The moving portion is built from

three-eighths-inch steel plate, welded together from pieces of from one to two hundred square feet each. No bolts or rivets are used and the plates are fitted to the required spherical or cylindrical shape in advance. Each plate weighs about a ton. The moving portion of the dome weighs about one thousand tons.

There are two great arches three feet wide and eight feet deep alongside the shutter opening, and a horizontal plate girder near the bottom of the moving part to keep the cylinder circular. The rigidity of the steel shell is such that only slight additional structural support is needed.

This inside framework was erected first to hold the plates during the welding process and to prevent buckling afterwards. This so-called monocoque type of construction, developed and used with such success in the airplane industry, gives the dome the right to be called streamlined in the sense that it is a modern edifice.

The inner surface of the dome is made up of aluminum-faced steel boxes four inches thick hung from the steel shell. These boxes contain layers of aluminum foil to keep out the heat of the sun, so that when night comes the instrument will already be at night temperature and no precious time will be lost having to wait for a gradual dissipation of heat and change of shape accompanying the cooling process.

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GEOPHYSICS

Magnetic Storm Disrupts Wire and Radio Services

MAGNETIC storm conditions of unusual severity wrought havoc in both wireless and wired communications from Jan. 16 to Jan. 18, while auroras flared over the North. Telegraph engineers reported that they had great difficulty getting traffic through from the East to the interior of the country, and radio telephone service to Europe was still out of commission on the eighteenth.

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PHYSICS

Houses Protected Against Winter by Cellulose Film

Transparent Covering May Be Applied Over Windows, Storm Sash, or Specially Built Frames; Cost is Low

CELLULOSE film wrappers, that now protect packs of cigarettes and nickel candy bars, will presently be fortifying whole houses against winter cold, if the method developed by the Yankee ingenuity of Prof. R. H. Wallace of Connecticut State College works out as well as it seems to promise.

Not that the whole house will be wrapped in the transparent sheets. That isn't necessary. But windows, outside cellar doors, and other warmth-wasting openings, Prof. Wallace has found, can be effectually insulated against the cold with cellulose film.

The film is useful even where storm sash is already used. One very effective trick is to put sheets of it on both sides of the sash, sealing the whole frame into a sort of envelope by means of a hot flatiron run along the overlapping edges. Common window screens can be treated in the same way. Or the sheeting can be mounted on specially made, lightweight frames.

The method is especially valuable for greenhouses, Prof. Wallace states. He is a plant physiologist himself, and has a small conservatory built as a lean-to against one wing of his house. Cellulose covering as an auxiliary to the glass saves him a substantial sum in reduced heating costs, he reports.

As a striking demonstration of the heat-saving effects achieved by his method, Prof. Wallace placed a series of thermometers by one of his windows that was protected both inside and out with cellulose film. One cold winter morning he took a photograph that showed all four instruments.

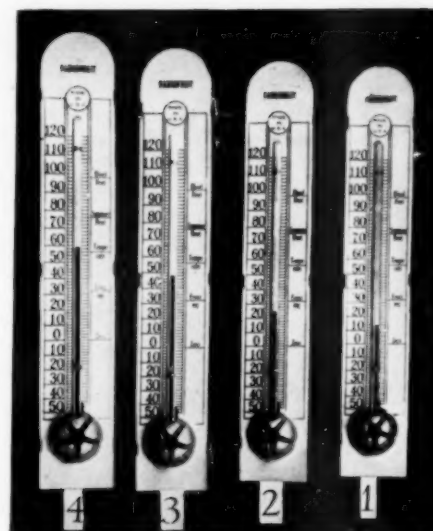
The outside thermometer, fully exposed to the weather, showed a reading of 12 degrees Fahrenheit. The next thermometer, between the outer film and the glass, read 24 degrees. The third, between the glass and the inner film, stood at 47 degrees, and the fourth, within the room and back of the protection of two cellulose films and one sheet of glass, told that room temperature at that point was 59 degrees.

Prof. Wallace has experimented with

a number of different makes of cellulose film, and states that the most satisfactory is the cellulose-acetate type in a somewhat heavier weight than is used for ordinary small-package wrapping purposes.

Cellulose film insulation for houses can be held to quite moderate costs. By interesting a number of his neighbors in a cooperative purchase last year, the Connecticut scientist found it possible to give protection to all windows of 30 ordinary-sized houses at a cost of about 15 cents per window.

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THERMOMETERS TELL

These four temperature readings, taken simultaneously within a few inches, bring out graphically the gains made by adding cellulose-film protection to a window.

SOCIOLOGY

Unemployed College Youth In Vanguard of Revolution

THE professions and the ranks of college graduates do not constitute that sector of civilization toward which one would be likely to look for the beginnings of a revolution.

Yet educated youth in the vanguard of revolution is not a surprising possibility in view of facts resulting from a world-wide survey of unemployment in the learned professions made by Dr. Walter M. Kotschnig, who has worked widely with student problems on an international basis.

Unemployment or under-employment of young college and university graduates may well have far-reaching repercussions even though the present crisis seems in many localities only temporary. Dr. Kotschnig observes: "Where the overcrowding of the professions leads to a prolonged unemployment of successive generations of graduates, it may become a formidable threat to the very existence of an ordered society."

Thousands of parents have saved and slaved a lifetime to give their children an education, only to see them in the end unemployed, very often broken in body and in spirit. To these fathers and

mothers Dr. Kotschnig dedicated the book (Oxford University Press) that reported his findings. He found promising young men and women, loaded with degrees and certificates, to whom society denies the opportunity to put to any use their gifts and their knowledge.

Dr. Kotschnig in his inquiring travels in European countries found graduates of two or three or four years ago, dejected, with blank hopelessness in their eyes. They had paid call after call, written letter after letter, all to no avail.

Then came the reaction. The old order was rotten, it must be destroyed. A new order must be created in which there would be room for educated youth to work and achieve position and happiness. In Germany and other disturbed nations unemployed professional men and women played important parts in revolutions.

Less dangerous is the situation in the U. S. A. There are, in Dr. Kotschnig's opinion, still wide occupational fields to be conquered, even in professions that now seem to be crowded. He urges a nation-wide search for new needs for professional services.

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CHEMISTRY

Plastic Made of Soybean Offers Use for Farm Products

HENRY FORD'S greatest love among the "chemurgic" products—agricultural products used industrially—that he sees aiding economic progress is known to be soybean protein plastic.

Already this synthetic material is understood to be used in manufacture of the steering wheel, horn button and other such parts of the Ford cars. It is first cousin to casein plastics, made from the jelly-like or cheese curd of milk, which have wide use in buttons, buckles, radio and electrical parts, etc.

The soybean is four-tenths protein compared with two-tenths oil. The protein portion can be mixed with water, various chemicals, colors, and filler material, such as wheat chaff, wood flour, etc., to make a useful member of the great group of materials that the chemist calls "plastics." Heat and pressure are used to temper the plastic after it is put into the desired shape.

In addition to development undertaken by Ford and other manufacturers, the

federal government through the Department of Agriculture's Bureau of Chemistry and Soils established early last year a soybean industrial research laboratory at Urbana, Ill., in cooperation with 12 North Central states. Here some 30 chemists and other staff members are developing and improving industrial uses of soybeans.

The Farm Chemurgic Council has been urging the industrial and other use of soybeans for several years as a part of its program to obtain the use of more American-grown agricultural products in industry.

Although the soybean was introduced in the United States as early as 1804; it is still one of the young giants in our industrial and agricultural life. In the Orient its uses have been many from time immemorial. In recent years the amount of soybean planted has increased greatly. Acreage in 1907 was only 50,000; in 1937 it was 6,049,000 according to preliminary figures. The 1937 crop was

between 36,000,000 and 40,000,000 bushels of the bean itself.

It is estimated that some 50 factories are turning out various industrial products using soybean products. Soybeans are used in making such products as paint, enamel, varnish, glue, printing ink, rubber substitutes, linoleum, insecticides, glycerin, flour, soy sauce, breakfast food, candies, roasted beans with nutlike flavor, livestock feeds, as well as plastics.

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DEMOGRAPHY

Population to Decline Despite Increases in Past

MAN POWER—or brain power—is the most valuable resource of the world, for out of it arises civilization and culture.

There has been a certain complacency about the renewal of our human resources. The population of the world trebled in the last 160 years. The white races increased from 150,000,000 people in 1780 to 635,000,000 in 1930. That would seem to justify the idea that there is no need for worry about the natural increase in population.

Today it is possible for the first time to inventory, with some scientific accuracy, man power not only by counting heads but by determining the contents of the heads. Frederick Osborn of New York City, who has collaborated with Dr. Frank Lorimer on population studies, reported recently to the American Association for the Advancement of Science that the old process of population growth is coming to a sudden stop among peoples living in cities.

By using crude birth and death rates, experts as recently as a decade ago found the population appeared to be rapidly increasing. But when the age grouping of the population and other factors were considered, it was found that true rates for 1930 were 16.9 births per 1000 and 16.3 deaths per 1000, contrasted with crude rates of 18.7 and 10.8.

The slight excess in the rate of intrinsic reproduction in 1930 above that needed for replacement has been whittled away since that time, Mr. Osborn finds. There is no doubt that the country is at present declining in numbers in the true or intrinsic sense.

The best guess of the population students is that the fall in birth rate will continue, and that the gross population will be something less than 150,000,000 in 1970, declining thereafter.

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PROTECTION FOR PLANTS

Extra protection is given the conservatory attached to Prof. Wallace's house at Storrs, Conn., by a covering of cellulose film outside the glass frames.

PLANT PHYSIOLOGY

Roots Grown on Petals Under Aseptic Conditions

PETALS and all other parts of flowers have been induced to form roots, in experiments reported by Prof. Carl D. LaRue of the University of Michigan.

Secret of this surprising feat was Prof. LaRue's new technique for keeping the small and delicate pieces of plant tissue alive and in good condition. He washed the petals and other parts in antiseptic solutions, strong enough to kill bacteria and molds but not strong enough to injure their tissues. Then he placed them on a sterile nutrient jelly containing sugar and essential mineral salts.

On this the parts lived indefinitely, and had plenty of time to strike root, after the more familiar but rougher cuttings of greenhouse and windowbox practice. Some of the species needed to be encouraged with the growth-promoting chemical, indole-3-acetic acid, but others started their roots without any outside stimulus.

Several specimens not only sprouted roots but started stems and leaves as well, and eventually grew up into complete, normal plants.

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PHYSIOLOGY

Drinking Is Really a Bitter World After All

AT LEAST in the realm of beverages it's a bitter world after all. Think back through the liquids you drink during a day. Such a list might well include tomato juice, orange juice, pineapple juice, or grapefruit juice for breakfast. Then water, tea, coffee, milk, chocolate milk, soft drinks, and possibly beer, wines, other alcoholic beverages. Not that any one person would drink all of these beverages during a single day or even in a lifetime, but they represent a cross section of what some Americans do drink, each to his inclinations. Of all these milk and water are about the only ones which do not have a tinge of bitterness.

The Industrial Bulletin of Arthur D. Little, Inc., points out that some people like their milk with chocolate flavor, which is bitter. Coffee and coffee substitutes are bitter and "burnt" flavored. Tea is bitter and astringent; cocoa is bitter and aromatic; tomato and the citrus juices and many "soft" drinks are bitter and sour. Beer, says the Bulletin, is outstandingly bitter.

Bitter, indeed, is America's quick breakfast of bitter grapefruit, bitter coffee and bitter orange marmalade although, in truth, sweetness is added to tone down the bitterness.

Actually bitterness—as one of the four fundamental tastes—has to be included in all highly-seasoned foods and drinks. "There is a sound physiological basis," states the Bulletin, "for table condiments including sugar for sweetness, salt for saltiness, vinegar or lemon juice for sour tang, and meat sauces, pepper and mustard competing for use in imparting bitterness."

There is the old belief—now not so well regarded as it was a generation ago—that bitters stimulate the appetite. The vogue of "stomach bitters," which provided a boon for proprietary medicines, was the result. It has never been disclosed, however, how much the alcoholic content of these "bitters" influenced zealous teetotalers to use them.

Science News Letter, January 29, 1938

PHYSICS

Scientist Reports "Dewbow" Formed on Surface of Lake

ALMOST everyone has seen a rainbow in the sky; but did you ever find one resting on the surface of a lake? Richard M. Sutton of Haverford College recently stood on the shores of Pocono Lake in northern Pennsylvania one bright morning, gasped, and saw a brilliant-hued rainbow almost beneath his feet.

In a recent issue of *Science* (Dec. 3), the scientist describes the amazing phenomenon and offers an explanation of its origin as determined by experiments in his laboratory.

Droplets of dew resting on the surface of the lake formed the colors, he reports, for he was able to duplicate the happening by spraying water on to a smoked plate of glass which the water will not wet. The drops, separate but lying close together, simulated the mass of falling raindrops in their physical effect on light.

Some time during the night, believes the scientist, the surface of the lake became covered with an invisible film of some organic material which allowed the water drops of dew to rest on the surface of the lake without wetting it. Then the sun came up and its rays were refracted by the dewdrops into the rainbow effect. Mr. Sutton calls the phenomenon a dewbow, rather than a rainbow.

Science News Letter, January 29, 1938

IN SCIENCE

ASTRONOMY

Flickering Planetoid Comes Close to Earth

EROS, the 35-mile-long flickering planetoid, was only 20,000,000 miles from earth last week. Turning over and over in space, exposing first its dull and then its shiny side, the coffin-shaped mass of cosmic junk kept about this distance for several days before starting its journey outward to beyond the orbit of Mars.

Discovered in 1898 by DeWitt, of Berlin's Urania Observatory, the little planetoid, one of many hundreds now known, has twice, in 1898 and 1931, come within about 16,000,000 miles of the earth.

Hermes, the half-mile-long celestial runaway which came within only 362,000 miles of the earth last October, has now gone too far away to be seen.

It is believed that many, perhaps all, of the planetoids are not spherical but irregular in shape.

Science News Letter, January 29, 1938

OCEANOGRAPHY

Ice-Breaker Party Drifting Faster Than Polar Campers

THREE Russian ice-breakers, caught fast in the ice of the Laptev Sea off the northern coast of Siberia, are drifting northward far more rapidly than Ivan Papanin and his three ice-floe camper companions have drifted since they landed near the North Pole, Tass, Soviet news agency, reports.

The three ice-breakers are the "Sedov," "Sadko," and "Malygin."

"We are drifting with the ice much more rapidly than the people of the 'North Pole' station—Papanin's ice-floe in seven months has advanced 1,500 kilometers whereas in only two months we have covered 770 kilometers," the party on the ice-breakers report. "Our average speed is close to 12 kilometers a day."

"Our ice-breakers drift northwestward. The direction of the drift partly coincides with that of the drift of Nansen's 'Fram.'"

Science News Letter, January 29, 1938

SCIENCE FIELDS

MEDICINE

Keeping Warm Is Vital For New-Born Babies

KEEPING new-born babies warm is a simple but important way of helping to cut down infant deaths, Dr. Horton Casparis of Vanderbilt University pointed out at the Conference on Better Care for Mothers and Babies held under the auspices of the U. S. Children's Bureau in Washington, D. C.

Before birth the baby has been living in an environment with a temperature of 98.6 degrees Fahrenheit, which may be compared to the wilting heat of mid-summer. An infant, especially a prematurely born infant, needs to be gradually acclimated to the temperature of his new environment, just as an adult is careful about not getting chilled after a hot bath. Failure to protect the baby against the change in temperature at birth may, directly or indirectly, be responsible for his death.

Science News Letter, January 29, 1938

BIOPHYSICS

M-Rays' Existence Doubted In Research Council Report

"NOT PROVEN" is the Scotch verdict returned by two critical biophysicists after a careful investigation of the disputed phenomenon of mitogenetic radiation, or M-rays. The two men, Drs. Alexander Hollaender and Walter D. Claus, pursued their researches at the University of Wisconsin for the National Research Council. (AN EXPERIMENTAL STUDY OF THE PROBLEM OF MITOGENETIC RADIATION—Alexander Hollaender and Walter D. Claus—*National Research Council*, 96 p., \$1.)

Mitogenetic radiation, known also by the convenient nickname of M-rays, was first reported by a Russian, A. Gurwitsch, some years ago. He stated that tissues of rapidly dividing cells, such as root tips, emanated some kind of short-wave radiation, of very low intensity, that nevertheless was capable of stimulating other cells to divide also.

Many other investigators, using many methods, have followed the work of Gurwitsch. A favorite set-up is an onion

root tip as source of the rays and a small mass of yeast cells as "biological detector."

Although many efforts have been made to detect the rays with mechanical apparatus, such as modifications of the Geiger counter used in cosmic ray work, none of them has ever been successful. This, however, does not necessarily militate against the validity of the observations, for living organisms are still far better detectors of many natural forces than any mechanism yet devised.

However, when Drs. Hollaender and Claus repeated the work very critically, using both physical apparatus and biological detectors and checking carefully every step in every experiment, they were unable to obtain any evidence satisfactory to themselves of the existence of mitogenetic radiation. They therefore rest their case with a negative verdict, at the same time stating their willingness to re-open it again if supporters of the M-ray hypothesis come forward with positive evidence produced under really rigorous experimental conditions.

Science News Letter, January 29, 1938

ARCHAEOLOGY

Cadmus of Alphabet Fame Believed To Be Myth

PHOENICIAN Cadmus, popular hero credited with fathering our alphabet, never existed, so far as archaeologists can learn. We should honor some Unknown Phoenician for teaching the Greeks ABC's, and the alphabet idea is older than Phoenicians, anyway.

Reporting latest views on the still-mysterious alphabet, Dr. John Day of Barnard College told the Archaeological Institute of America that Greeks probably derived the alphabet from Phoenicians about the middle of the ninth century B. C. Dr. Day succeeded in narrowing down the date by demonstrating from old inscriptions that five of the Greek letters could not have evolved later than the ninth century, and five other Greek letters could not have evolved earlier.

Questioning the recent assertion by "an eminent authority," that Cadmus lived about 1400 B. C., Dr. Day pointed out that when archaeologists dug at the citadel of Thebes, Greek town supposedly founded by Cadmus, they found no trace of Phoenician relics or writings.

"We must conclude," he declared, "that the only definite historical element contained in the legend concerning the letters of Cadmus is the fact of the Phoenician origin of the Greek alphabet."

Science News Letter, January 29, 1938

AVIATION

Air Pressure Difference Will Seal Doors of Planes

STRATOSPHERE luxury liners of the future will use the low air pressure at high altitudes itself to seal their doors against the relative lack of air outside and to maintain normal atmospheric pressure inside, according to an invention patented by Stephen J. Zand of Forest Hills, N. Y.

A rubber tube around the door jamb is filled with air at ground-level pressure. Because of the difference between the pressure inside the tube and outside the plane it will swell up to make an airtight seal, according to the specifications accompanying the patent, numbered 2,104,144.

The new method worked out by Mr. Zand, noted as an airplane soundproofing engineer, is also claimed to be effective as a further means of locking the plane's door when it is in flight, for the swollen tube will make it more difficult to open.

The device takes advantage of the fact that air pressure decreases rapidly as the plane goes higher. At an altitude of three miles, the air confined in the tube would be at approximately twice the pressure of the air outside. Much like a balloon loaded with gas at a pressure higher than that of the surrounding atmosphere, the tube will swell up, filling every crevice between the door and the fuselage of the plane. The higher the plane goes, the lower the pressure outside and consequently, the tighter the seal.

Science News Letter, January 29, 1938

HORTICULTURE

"Canned Heat" Used for Killing Slugs and Snails

AUSTRALIAN gardeners are quite literally "putting the heat" on slugs and snails that chew up their pet plants.

It has been discovered, in England, that these garden pests can be so paralyzed by a chemical known as metaldehyde that they remain helpless while the sun dries them out and kills them. In Australia metaldehyde is not obtainable in ordinary chemical trade. But a form of "canned heat," sold under the trade name Meta, consists almost entirely of metaldehyde. So Australians grind it up, mix it with slightly moistened bran, and spread it where the slugs and snails come to feast.

Science News Letter, January 29, 1938

ASTRONOMY

Bright Sirius Rules

February's Planets, Mars and Saturn, Set Early; Month is Unusual In That it Has No New Moon

By JAMES STOKLEY

TWO planets can be seen in the February evening sky, if you look early enough. Just as soon as it gets dark, at the beginning of the month, they are visible, close together, in the southwest. They are nearly the same brightness, but one is distinctly red in color. This is Mars. The other is Saturn. Mars passes Saturn on Feb. 2 at 3:00 p. m., Eastern Standard Time, and, after that, appears farther and farther to the east.

Neither of these planets is visible late enough to appear on the accompanying maps, in which the heavens are shown as they are at 10:00 p. m., February 1, 9:00 p. m. on the 15th and 8:00 p. m. on the 28th.

Late Winter Stars

The stars of the late winter evening are all in view, however, with Sirius, brightest star of the night sky, high in the south. Above, and to the right, is Orion, the warrior. The three stars in a row, forming the warrior's belt, make this easy to locate. North of the belt is Betelgeuse, while to the south is Rigel.

About as far to the right of the belt as Sirius is to the left, we find Aldebaran, marking the eye of Taurus, the bull. Still farther over is a little cluster of stars, the Pleiades, often called the "seven sisters." Most people can see only six of the sisters with unaided vision, though a telescope, or even binoculars or opera glasses, reveals many more.

Nearly overhead is another bright star, Capella, in Auriga, the charioteer, while nearby, more to the south, is the figure of the twins, Gemini. This has two bright stars, Castor and Pollux, the latter being the more brilliant. Below the twins is Procyon, in Canis Minor, the lesser dog.

The region of the sky around Orion contains more bright stars than any other similar area of the sky, and to learn these is to make an excellent start towards knowing the constellations. But another of the first magnitude is shining high in the east. This is Regulus, in Leo, the lion, and it stands at the end of the handle of a smaller, unofficial, group, called the "sickle."

Toward the north there are a number of conspicuous stars, though none are of quite the first magnitude. Some of these are the seven that make up the familiar Great Dipper, which hangs in the northeast, with the handle down. In the northwest is Cassiopeia, shaped like a letter W lying on one side.

Parts of the Ship

Low in the south at this time of year appear some stars referred to on the map as Puppis and Pyxis. These are not as bright as those we have mentioned above, and, being so low, they are not very conspicuous. They have an interest, however, because they are part of the huge constellation of Argo, the ship, an important mythological figure, because it is supposed to be the vessel that carried Jason and the Argonauts on their expedition in quest of the golden fleece. It is so big that it is subdivided into four parts, Puppis, the stern, Pyxis, the compass, Vela, the sail, and Carina, the keel. The last named part contains the brightest stars, notably one called Canopus, which do not rise in most of the United States. From the southernmost states, however, Canopus can be seen.

When you look at Sirius, to the south, not only are you looking at the brightest star in the sky (with the exception of the sun) but also one of the nearest.

In fact (again excepting the sun) only one star that can be seen with the naked eye is closer. The sun's distance is 92,900,000 miles. As light travels eleven million miles a minute, its illumination reaches us in about eight minutes. But Alpha Centauri, nearest naked eye star, is at a distance of some 25,000,000,000,000 (twenty-five trillion) miles, and its light takes 4.3 years to get to us.

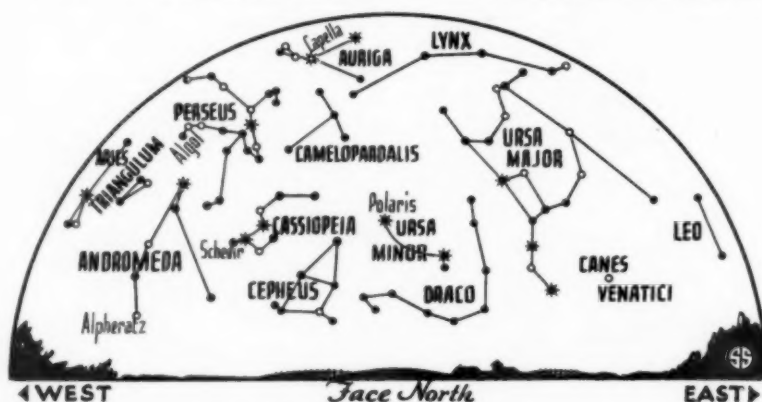
Consequently, to avoid awkwardly large numbers, we say that its distance is 4.3 light years. Sirius is about 9 light years away, so that the light from Sirius that enters your eye tonight left in the good old days of 1929. The distance of nearby Betelgeuse is 112 light years, while Rigel is at a distance of 541 light years. Others, fainter, are at distances calculated in terms of thousands of light years.

The Faint Companion

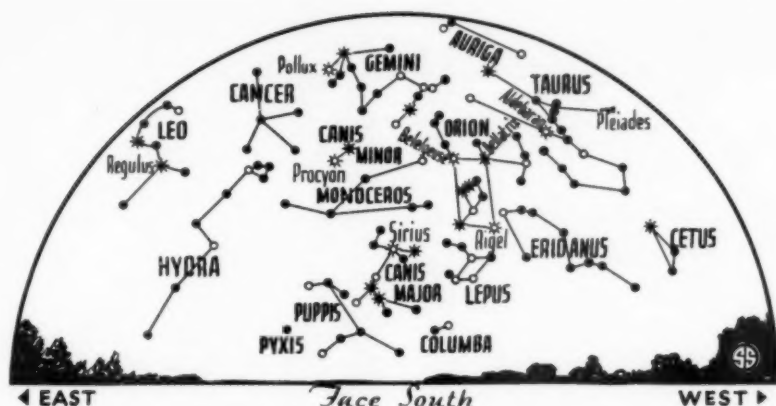
Sirius has another distinction because it is attended by a companion that was discovered before it was seen. Many stars in the sky are double, and the telescope shows that they consist of two separate orbs, revolving around their common center of gravity.

Imagine two heavy iron balls, tied together by a short chain, and thrown through the air. As they fly along, they would turn around a point half way between them, if both have the same weight. In a double star, the force of gravitation is the invisible chain that holds the pair together. All the stars are

★ ★ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



In the western sky are the constellations representing proud Queen Cassiopeia, her daughter Andromeda, and the hero-rescuer, Perseus.



SIRIUS HOLDS CENTER OF STAGE

Winter constellations are rich in bright stars, but the February sky is empty of planets except very early in the evening.

moving through the sky, and careful measurements of the position of a double star may show that the center around which they turn may move along a straight line, though the stars themselves swing sometimes to one side and sometimes to the other.

A little over a century ago, a German astronomer, F. W. Bessel, made accurate measurements of Sirius, and found that it was moving in a wavy line, though he could see no other star to balance it. Nevertheless, he fully realized that something must be there, pulling the visible star first one way, then the other, and concluded that it had a massive, though thus far unseen, companion.

Seen With New Lens

It remained for an American telescope maker, Alvan Clark, Jr., of Cambridgeport, Mass., to find this companion. In 1862 his father had just completed a telescope lens, 18 inches in diameter, which is still used at the Dearborn Observatory of Northwestern University.

It was placed in the testing tube in the factory yard one night, and Alvan Senior started to turn it to Sirius, as a handy star on which to try it. The big tube was cumbersome, so he asked his son to point it. Alvan Junior did so, and no sooner did he look than he exclaimed, "Why father, Sirius is double!" Thus, quite by accident, the companion discovered by Bessel was finally observed. Since then, as telescopes have been improved even more, it has been seen many times, and has been found to be of the eighth magnitude.

A star this bright is not ordinarily difficult to see, even with small instruments, but the overpowering glare of Sirius itself obscures it. The companion

goes around the main star in an elliptical orbit in slightly less than 50 years. In 1944 the two will be closest together, as seen from the earth.

Same Temperature

As further studies of the two stars were made, astronomers found that they are of practically the same color, which means that they have the same surface temperature, and consequently are giving the same amount of light per square mile. Since they are at the same distance from the earth, this means that the faint star must be vastly smaller than the bright one, scarcely larger, perhaps, than one of the larger planets.

From the way in which the parts of a binary star revolve around each other, it is possible to find their masses, that is, the amount of material that each contains. Thus it was determined that the companion of Sirius has about as much matter as Sirius itself. Being so much smaller, therefore, this means that the density of the companion must be inconceivably great. The old rule, "A pint's a pound, the world around," is approximately true for water. A pint of the companion of Sirius material, however, would weigh some 30,000 times as much, or about 15 tons.

An additional confirmation of this remarkable idea came about 1925 when Dr. Walter S. Adams, director of the Mt. Wilson Observatory, found that the lines appearing in the spectrum of the companion were shifted to the red end more than those in Sirius itself. This was not due to motion of the star away from us, which is often the case, for then both spectra would have shown the same shift.

Instead, it was due to an effect predicted as a result of Einstein's theory of

relativity. This is that light radiating from such a dense body loses energy, which loss causes the shift of the lines. The predicted shift was in close agreement with that found by Dr. Adams, and the Einstein theory had another point in its favor.

An inspection of the table of phases of the moon, given below, will show one rather unusual feature—only three are given, instead of the usual four. During February there will be no new moon.

This can happen only in February. The time required for any particular phase of the moon to happen again is about 29.5 days, the so-called "synodic month." Thus, in a 30 or 31-day month there must be a full cycle, with all four phases. But in February, even in a leap year, and especially when only 28 days long, the month is shorter than this cycle. If the new moon comes on the last day of January, which it did this year, the next will not come until 29.5 days later, which brings it to the night of March 1.

Moon Passes Planets

On the afternoon of February 4, the moon will pass Jupiter and Mars, so it will be seen that evening, as a narrow crescent, near these two planets. On the night of the 8th, the moon will pass in front of, or "occult," a fifth magnitude star, called omega Tauri, in the constellation of Taurus, the bull. This will happen around 1:00 a. m., Eastern Standard Time. Perigee, when the moon is closest earth, happens on the 12th, at 1:00 a. m., with a distance of 226,300 miles, while apogee, the moment at which it is farthest, comes at 8:00 p. m. on the 23rd, with 251,400 miles.

Phases of the Moon

		E. S. T.
First Quarter	Feb. 7	7:32 p. m.
Full Moon	Feb. 14	12:14 p. m.
Last Quarter	Feb. 21	11:24 p. m.

Science News Letter, January 29, 1938

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AVIATION

Modern High-Speed Bombers Show Very Bad Marksmanship

Cause for Encouragement to Peaceful Peoples, Declares Military Student; Mud Still a Great Defensive Weapon

POOR marksmanship by aerial bombers in the Spanish war "has given cause for more encouragement than discouragement to peaceful peoples," declares Capt. Liddell Hart, well-known student of military science. (*Army Ordnance*, Jan.-Feb.)

The very increase in speed that marks modern bombing planes is an important factor in their inability to hit the traditional "flock o' barns."

"Higher speed in the air has offset the improvement of bomb sights and diminished the accuracy of bombing, owing to the fact that the bomb has to be released before the aircraft is over its target," writes Capt. Hart. "As a result, it was found that targets less than 500 yards long and 150 yards broad rarely were hit."

"Attempts to destroy bridges or to put individual batteries out of action failed even when the attacking machines came down to heights of less than a thousand feet, while attacks on fortified positions only have taken effect where these were clearly defined and the bombing formations could operate undisturbed."

"It has been against large targets, such as towns, that the results have been most marked, although even in such cases the actual point hit within the area has been largely a matter of chance. Night bombing has proved more inac-

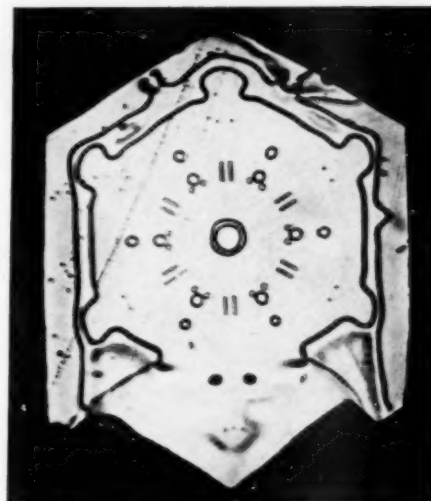
curate."

The real effectiveness of airplane attack, Capt. Hart feels, has been moral rather than material. When troops without adequate anti-aircraft defenses find themselves under consistent and heavy attack from the air, and especially when they see other airplanes going off to attack their home towns in the rear, they are apt to become disheartened and to offer poor resistance against infantry or tank assaults following up the enemy bombing.

The high speed of bombers and other aircraft has been their undoing in another way, under the hurly-burly of field conditions, Capt. Hart points out. The small size and rough surface of the average improvised landing field has proved fatal to planes with high landing speeds, producing many crashes.

And for all the improvements in tanks, and all the advances in other machines of war, one of the greatest enemies of the attack and friends of the defense, is old conservative General Mud. Whether infantrymen are wearily slogging forward on foot, or tanks are rattling ahead on their tractor treads, if they strike boggy going they might as well quit. If they stubbornly push on, presently they find themselves glued like flies on flypaper, immobilized into mere targets.

Science News Letter, January 29, 1938



DESIGN FOR A CLOCK FACE

This pattern, that looks as though it might be an artist's sketch for a new, ultra-modern electric clock, actually is a photograph of a snow crystal, made by the late W. A. Bentley. One side, apparently damaged in some way, rebuilt itself, restoring the hexagonal symmetry but not the original pattern.

MILITARY SCIENCE

Nations Pile up Stocks Of Civilian Gas Masks

EUROPEAN nations are piling up stocks of gas masks for civilians and spending huge sums in the construction of gasproof shelters, reports Lt.-Col. Augustin M. Prentiss of the U. S. Army chemical warfare service.

England is engaged in manufacturing 30,000,000 gas masks, in an effort to provide protection for every person in the kingdom. France already has accumulated 8,000,000 for its active civilians, Germany has on hand 7,500,000, and Italy 5,000,000 for the same purpose.

Cost of gas shelters ranges from \$150 for a single room to \$100,000 for large communal shelters capable of accommodating several thousand persons. In France, plans have been drawn for the construction of fifty large gas shelters in the subways, at an estimated cost of \$5,000,000. Germany believes in a decentralized gas defense system, and it is claimed that more than half a million such small shelters have already been built. Similar construction is also under way in Japan.

According to Lt.-Col. Prentiss, civilians are classified into "active" and "passive" groups. The former, about ten per cent. of the total population, comprise policemen, firemen, decontamination squads, and others who must stay out even in

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the thickest of the gas attack to preserve order and clear out the gas after the raiders have flown away. The great "passive" bulk of the people can best meet a gas raid by taking shelter until it is over.

For the active civilians, elaborate gas-proof suits have been designed, together with military-type masks giving full protection. For the passive group, less elaborate and costly equipment, effective during short exposures only while they make for the gasproof shelters, is considered sufficient.

Science News Letter, January 29, 1938

SEISMOLOGY

Tenth of Earthquakes Occur at Great Depths

DEEP-FOCUS earthquakes, disturbances whose actual centers are scores or hundreds of miles underground, account for about ten per cent. of all recorded shocks. They release tremendous amounts of energy, yet seldom cause the death and destruction for which the more numerous surface earthquakes are responsible.

A summary study of deep-focus earthquakes has recently been made by Drs. Andrew Leith, of the University of Wisconsin, and J. A. Sharpe, of the Los Angeles laboratory of the Western Geophysical Company. They are convinced that except for factors introduced by the great depths themselves, there is no essential difference between the deep and the shallow earthquakes.

Both types occur in the same general regions of the earth—one a great horse-shoe-shaped zone roughly arching about the Pacific, the other stretching in a long line from Portugal to Formosa. Both types vary greatly in amount of energy released. Due largely to their great depths, the deep class of earthquakes have surface results more widespread and diffuse, hence less destructive, than the shallow-focus disturbances.

Deep-focus earthquakes may occur at all depths from 100 kilometers beneath the surface to 700 kilometers—the greatest depth for any earthquake thus far on record.

Where the vast stresses needed to power such earthquakes come from is still pretty much of a riddle. Cycles of deep earthquakes have been correlated with the forces resulting from the moon's movements and other outside factors, but the stresses involved in these are so small that their action is undoubtedly that of triggers rather than of main cause.

Science News Letter, January 29, 1938

ARCHAEOLOGY

Unearth Six Centuries of Painting in Antioch Floors

A COMPLETE history of painting from the first to the sixth centuries after Christ has been discovered through excavation of a unique series of mosaic floors in houses in Antioch, Syria, it was announced at the annual meeting of the Archaeological Institute of America at Philadelphia, by Dr. F. O. Waage of the Department of Classics of Cornell University.

Dr. Waage exhibited for the first time photographs of the remarkable mosaics which were copies of long since destroyed paintings of early masters. Executed with remarkable craftsmanship, the mosaics retain the original color effects of the variegated bits of limestone, terra cotta and glass which were used in their design.

Found by natives during the fall and winter and cleared and lifted by the expedition, several mosaic floors in the suburb of Antioch called Daphne are unusually important. One is a well-preserved panel of Narcissus, probably third century, and a striking panel of a striding lion set in an immense field of patterned flowerets, of the fifth century.

Another mosaic realistically shows the courses of a Roman banquet. One panel contains artichokes, pigs feet, eggs in egg cups and bottles of wine.

Supported by the Worcester, Fogg, Baltimore, and Louvre, Paris, Museums and Princeton University, excavations have been carried on at Antioch during the past spring and summer and will be continued next year.

Science News Letter, January 29, 1938

ISSUED

December, 1937

AUTOBIOGRAPHY OF ISAAC J. WISTAR

1827 - 1905

"When one not inordinately addicted to discoursing of himself begins to contemplate a lapse from such negative virtue . . ."

Isaac J. Wistar, who never confused modesty with self-repression, opens his autobiography in this forbidding, Victorian language. But he soon shifts to easily written, easily-read narrative, reflecting Dana's "Two Years Before the Mast" in its salt-tanged sea tales; twinkling here and there with a roguish humor not unworthy of Mark Twain, his contemporary; and pausing at the end of blood-and-thunder passages for Wistar, the adventurer, to allow the scientific-minded Wistar to relate some wound treatment or psychological observation.

For Wistar lived through remarkable times and made the most of them. He traveled across the continent with the vanguard of the Forty-Niners in a journey almost epic in itself. He earned and lost small fortunes as a miner, trap-

per, muleteer, speculator, and lawyer before he was thirty, such was his versatility.

He killed Indians relentlessly when menaced; yet he considered creation of an Indian empire to halt encroachment of white settlers on the "rightful owners" of the land. He never hesitated to pistol, club, or butt anyone who crossed him; yet the Governor of California singled him out to suppress the Vigilante rioters of 1856. He stood armed to fight Abolitionists and believed ardently in State rights; yet his privately-raised regiment is credited with saving the Union at Gettysburg and in the Seven Days Battles.

All these seeming inconsistencies become an orderly part of the picture of the day in Isaac J. Wistar's forceful writing of his autobiography. It is the last word from a leader of a vanished American generation.

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Too Many Mouths

GAME management has been for so long a matter of saving the fragments that this generation still thinks of it in terms of conservation only. But the simple command, "Don't shoot!" no longer covers the case. In many places a more liberal, though still regulated, policy of game removal seems now in order.

One of the points laid before the recent meeting of the Society of American Foresters in Syracuse, N. Y., in an address by Dr. Homer L. Shantz, chief of the division of wildlife management of the U. S. Forest Service, was the overcrowding of parts of the big-game ranges in the national forests.

"Deer protected by a buck law and control of predators have over-used their range, especially in winter," Dr. Shantz said. This is true in both western and eastern forests.

The fact that deer know no man-made, legal boundaries complicates the problem. In summer, the range within the national forests takes adequate care of the herds. In winter, they migrate out of the jurisdiction of the Forest Service, into lands where their needs are not taken adequately into consideration. Too often the result is winter starvation. In

their more restricted habitats, elk present something of the same problem.

The solution does not necessarily consist in shooting the deer until the herds fit the present range. A possible alternative, more pleasant for most of us to contemplate, is to enlarge the range to fit the herd. Or, more exactly, to enlarge

the winter range until it balances the summer range in sustaining capacity, and then seeing to it that the herd stays within this balanced capacity.

The governing principle, Dr. Shantz emphasized, is that biological needs shall decide action rather than dogmatic fiat.

Science News Letter, January 29, 1938

PHILOSOPHY

Brain and Intelligence Grew Together, Says Dr. Ritter

WHICH came first, brain or intelligence?

This scientific version of the old hen-and-egg question, propounded by a well-known anthropologist, is answered in the course of an article in the *Scientific Monthly* by Dr. William E. Ritter, professor emeritus of zoology at the University of California, and co-founder and honorary president of Science Service.

Neither brain nor intelligence preceded the other, declares Dr. Ritter. They grew up together, along with all the rest of the unified organism they belong to. "Neither in biotic metabolism nor logic can an organ and its function exist, strictly speaking, the one *before* the other."

Part of Whole Pattern

Man does not have the kind of mind he possesses merely because of the physical development of one special part or organ, however important that part may be. In man, as in all other animate forms, the mental pattern has developed as a part of the whole life pattern.

Our brain and our way of using it is intimately influenced by our whole head and our way of using other parts of it, as the mouth for eating and making sounds, or the eye for seeing and guiding movements.

All the rest of the body is involved in brain (and mind) evolution also, Dr. Ritter points out. Especially intimate and influential in their mutual relationship has been the brain-and-hand combination. The statement that man's head is to a large extent the product of his own handiwork is not altogether a paradox or an hyperbole.

As another example of mutual developmental influence between head and forelimbs Dr. Ritter selects the woodpecker, of which he has long made a special study. The bird's brain and other

head-organs are influenced by the development of the forelimbs into wings as are man's brain and head by the fact that his forelimbs have grown into arms with hands at their ends.

Science News Letter, January 29, 1938

ENTOMOLOGY

Want Key-of-G Crickets; Princeton Sends Regrets

CRICKETS in the Key of G, that chirp one-beat notes in four-four time, wanted in Hollywood to accompany a singer in a new film now in the making. Right away, of course.

Princeton University biologists were astounded to receive these specifications in a wired request from the property (or was it the publicity?) department of a West Coast studio. The filmologists even went learned on their bug-spearing colleagues, and specified specific species: they wanted *Gryllus domesticus* or *G. neglectus*, and nothing else but.

There are plenty of crickets in Hollywood of course, but voice tests proved them to be sissies with no hair on the chest at all; they chirp only in B-flat. Sound-effect men tried their hands; but with all their ingenuity they could not make a noise like a Key-of-G cricket. Hence the hurry call to Princeton for a quick lateral.

Never doubting at all that New Jersey can produce any desired number of deep-voiced G-crickets, the Princeton biologists nevertheless had to wire back that they cannot fill the order just now. Princeton crickets are like bears—they sleep all winter.

Science News Letter, January 29, 1938

Navajo Indians in one part of Arizona are blaming a new air route for weather troubles; they say the airplanes scare off the Rain Bird.

● RADIO

February 3, 4:00 p. m., E.S.T.
THE USEFUL SOYBEAN—Dr. Henry J. Knight, Chief of the U. S. Bureau of Chemistry and Soils.

February 10, 4:00 p. m., E.S.T.
POWERFUL X-RAYS—Lauriston Taylor of the National Bureau of Standards.

In the Science Service series of radio discussions led by Wadson Davis, Director, over the Columbia Broadcasting System.

• First Glances at New Books

Additional Reviews
On Page 80

Seismology

THEORETICAL AND APPLIED SEISMOLOGY—Akitune Imamura—*Maruzen Co., Tokyo*, 358 p., \$3.50. A veteran master of the science of seismology here gives us the ripe fruit of his many years of experience and study. Translated into excellent English by Prof. Imamura's friend, D. Kennedy of Yokohama, and put into remarkably good print by a Tokyo firm, this book comes as a most timely offering that will triumphantly survive present political shocks and leave the author's scholarly fame standing for generations, solid and imperturbable as Fuji.

Science News Letter, January 29, 1938

Astronomy

A STAR ATLAS AND REFERENCE HANDBOOK (EPOCH 1920) FOR STUDENTS AND AMATEURS (6th ed.)—Arthur P. Norton and J. Gall Inglis—*Gall and Inglis, Sold in America by Eastern Science Supply Co.*, 49 p., 17 maps and text, \$5. A new edition of a very successful handbook for amateur astronomers.

Science News Letter, January 29, 1938

Ornithology

OUT OF DOORS WITH BIRDS—Emma F. Byers—*Womans Press*, 84 p., \$1. A book of appreciation of birds, rather than a handbook for bird identification or bird study. It will appeal especially to those who are fond of birds and want to know something more about them without burdening themselves too heavily with ornithological detail.

Science News Letter, January 29, 1938

Paleontology

METHODS IN PALEONTOLOGY—Charles L. Camp and G. Dallas Hanna—*Univ. of California*, 153 p., \$2.50. A technical book for the paleontological student and collector. It is clearly written, and contains good illustrations, index and bibliography.

Science News Letter, January 29, 1938

Geology

EARTH-LORE: GEOLOGY WITHOUT JARGON—S. J. Shand—*Dutton*, 144 p., illus., \$1.25. Not pretending to be exhaustive, this small popularly-styled book has an attractively written text. No index.

Science News Letter, January 29, 1938

Geography

ANTARCTIC ICEBREAKERS—Lorene K. Fox—*Doubleday*, 319 p., illus., \$2.50. The lure has been strong for many years, of the earth's most severely for-

bidden land, the land that is mostly ice—Antarctica. Here is a popular account of efforts toward Farthest South through something more than a century and a half, from sailing ships to the aircraft of Ellsworth and Byrd.

Science News Letter, January 29, 1938

Geography

HEROES OF THE FARTHEST NORTH AND FARTHEST SOUTH (Rev. ed.)—J. Kennedy Maclean and Chelsea Fraser—*Crowell*, 484 p., \$2.50.

Science News Letter, January 29, 1938

Biology

THE AXIOMATIC METHOD IN BIOLOGY—J. H. Woodger—*Cambridge (Macmillan)*, 174 p., \$3.75. The effort is here made to apply the methods of modern symbolic logic to concepts in biology, thereby conferring on that "inexact" science at least part of the strictness of method possible in such disciplines as physics and astronomy, where full mathematical expression is possible.

Science News Letter, January 29, 1938

Medicine

THE ROMANCE OF RUSSIAN MEDICINE—Michael L. Ravitch—*Liveright*, 352 p., \$3. This readable history of Russian Medicine contains much material that will be interesting to non-medical as well as medical readers.

Science News Letter, January 29, 1938

Medicine

EPITOME OF THE PHARMACOPEIA OF THE UNITED STATES AND THE NATIONAL FORMULARY WITH COMMENTS—Robert A. Hatcher, Ernest E. Irons, Torald Sollmann and Paul N. Leech—*Amer. Medical Assn.*, 244 p., 60 c.

Science News Letter, January 29, 1938

Education

THE SELECTION OF BOOKS FOR ADULT STUDY GROUPS—Margaret Charters Lyon—*Teachers College, Columbia Univ.*, 228 p., \$2.35. This is a technical book for educators on standards for selecting reading materials, and does not contain bibliographies.

Science News Letter, January 29, 1938

Engineering

SYMPOSIUM ON CORROSION TESTING PROCEDURES—*American Society for Testing Materials*, 131 p., \$1.25 paper, \$1.50 cloth.

Science News Letter, January 29, 1938

Botany

FLORA OF PERU, Part VI. No. 2—J. Francis Macbride—*Field Museum of Natural History*, 126 p., \$1.50.

Science News Letter, January 29, 1938

Physics

GLOSSARY OF PHYSICS—Le Roy D. Weld, ed.—*McGraw-Hill*, 255 p., \$2.50. What is a Compton electron, or a gilbert, or the Kossel-Somerfeld laws? This valuable glossary of terms in physics will give you the answers, along with hundreds of items currently used in this science. Prof. Weld started this book as a collection of cards in an index, for the use of his students. With the aid of a large advisory committee, the material is now made available to everyone.

Science News Letter, January 29, 1938

Radio

RADIO AMATEUR COURSE—George W. Shuart—*Short Wave & Television*, 142 p., 50 c. An elementary self-instruction course on radio by an amateur operator.

Science News Letter, January 29, 1938

Mathematics

BUSINESS MATHEMATICS: AN INTRODUCTORY TEXTBOOK—J. Donald Watson—*Ronald Press*, \$2.50. Interest, foreign exchange, annuities, bonds and merchandise are some of the chapter headings of the book which disclose the scope of this university text. The author is associate professor of finance at the University of Notre Dame.

Science News Letter, January 29, 1938

Mathematics

BUSINESS ARITHMETIC (Rev. ed.)—C. W. Sutton and N. J. Lennes—*Allyn and Bacon*, 586 p., \$1.40. Mathematics for schools of commerce in high schools or colleges as well as in business schools. Plenty of problems and numerous drills in fundamentals make this a worthy book.

Science News Letter, January 29, 1938

Astronomy

THE NATURE OF VARIABLE STARS—Paul W. Merrill—*Macmillan*, 130 p., \$2. For both the trained astronomer and the layman interested in astronomy is this book on the known knowledge of those stars which change their brightness. The volume is the outgrowth of a series of articles appearing in *Popular Astronomy*.

Science News Letter, January 29, 1938

Biology

LABORATORY OUTLINES FOR ANIMAL BIOLOGY (Rev. ed.)—Michael F. Guyer and Halcyon W. Hellbaum—*Harper*, 273 p., \$1.50. A new edition of one of the most thorough and carefully planned laboratory manuals available for first-year college work in zoology.

Science News Letter, January 29, 1938

• First Glances at New Books

Additional Reviews
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Child Psychology

PREDICTION AND PREVENTION OF READING DIFFICULTIES—Margaret A. Stanger and Ellen K. Donohue—*Oxford Univ. Press*, 191 p., \$2. So many children have their own individual difficulties in learning to read and write that such difficulties may almost be considered as normal. If your child or your pupil fails to learn easily, he should have the benefit early of individual study as well as instruction. This volume by a psychologist and a director of speech education gives aid in the diagnosis and prevention of reading difficulties.

Science News Letter, January 29, 1938

Public Health

PERSONNEL POLICIES IN PUBLIC HEALTH NURSING—Marian G. Randall—*Macmillan*, 170 p., \$2. Nursing organizations, registries of nurses and organizations which require nurses on their staff should find useful this volume, prepared for the National Organization for Public Health Nursing.

Science News Letter, January 29, 1938

Child Psychology

MODERN WAYS WITH BABIES: PHYSICAL AND MENTAL DEVELOPMENT—Elizabeth B. Hurlock—*Lippincott*, 347 p., illus., \$2.50. An authentic book containing the information that parents want to have about their children. The author intends this volume to bridge the gap between the scientific investigators and parents.

Science News Letter, January 29, 1938

Psychology

HELP YOURSELF TO HAPPINESS—David Seabury—*Whittlesey*, 345 p., \$2.50. This book is designed, according to the publisher, to help the reader cure himself of his mental difficulties. It is written in popular entertaining style. It should not, of course, be substituted for a visit to the physician in case real mental illness is present.

Science News Letter, January 29, 1938

Psychology

THE REAL USE OF THE UNCONSCIOUS—Chandler Bennitt—*Dial Press*, 380 p., \$3. A psychological work which does not seem to have the practical application that might be implied by the title.

Science News Letter, January 29, 1938

Sociology

MORE SECURITY FOR OLD AGE—Margaret Grant Schneider and the Committee on Old-Age Security—*Twentieth Century Fund*, 191 p., \$1.75. The authors estimate that the cost of old-age

security in the United States will amount in 1980 to more than three and one-half billions of dollars. They believe that the adoption of the present Social Security Act was a significant start in providing adequately for the aged. A plan is offered by the committee for filling what they believe to be inadequacies and shortcomings in the Act.

Science News Letter, January 29, 1938

Botany

GUIDE TO EASTERN FERNS—Edgar T. Wherry—*Science Press*, 220 p., illus., \$1. Wherry's name has come to be synonymous, among botanists, with careful, accurate taxonomic work and a judicious and sympathetic understanding of the ecological requirements of the plants he deals with. This small but complete and well illustrated book on ferns (pocket size for field convenience) is certain of enthusiastic welcome and wide use.

Science News Letter, January 29, 1938

General Science

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION AND FINANCIAL REPORT OF THE EXECUTIVE COMMITTEE OF THE BOARD OF REGENTS, 1937—*Govt. Print. Off.*, 123 p., 20 c.

Science News Letter, January 29, 1938

Photography

THE PHOTO-GUIDE. 5: HOW TO ENLARGE—W. Peterhans, 41 p. **6: VIVID PORTRAITS WITH A SIMPLE CAMERA**—W. H. Doering, 40 p. **7: LIGHT FILTERS, HOW AND WHEN TO USE THEM**—K. Brandt, 40 p. **8: ACTION SNAPSHOTS, HOW TO TAKE THEM**—H. Starke, 44 p.—*American Photographic Publishing Co.*, 50 c. ea. Good, sound, simple, clearly-illustrated descriptions of how it's done, useful to any photographer who wants more than "just snapshots."

Science News Letter, January 29, 1938

Photography

MODERN MASTERS OF PHOTOGRAPHY. SERIES I: PICTORIALISTS—Heyworth Campbell, ed.—*Galleon*, 37 looseleaf plates, each 11x14 in., \$3. A beautiful job, deserving many hours of careful study.

Science News Letter, January 29, 1938

Photography

MAKING PICTURES WITH THE MINIATURE CAMERA: A WORKING MANUAL—Jacob Deschin—*Whittlesey House*, 156 p., 47 plates, \$3. A book dedicated to the beginner.

Science News Letter, January 29, 1938

History of Science

NATURALISTS OF THE FRONTIER—Samuel Wood Geiser—*Southern Methodist University Press*, 341 p., \$3. What carries men of fine mind, many of them of distinguished ancestry and position, to lost and dusty frontiers, years of obscure poverty, and in the end perhaps unmarked graves and forgotten names? Prof. Geiser's careful biographical research and sympathetic narrative of the lives and labors of a number of such figures gives us understanding. These also followed the gleam that led Columbus and Magellan, LaSalle and Marquette, and if the world at large knows little of their work, that work is still not lost. It underlies much of our modern scientific knowledge, like solid bricks in the lower courses of a foundation.

Science News Letter, January 29, 1938

Physics

HYDRO- AND AERODYNAMICS: A THEORETICAL TEXTBOOK FOR ADVANCED STUDENTS OF AERONAUTICS, HYDRAULICS, PHYSICS AND MATHEMATICS—S. L. Green—*Pitman*, 166 p., \$3.50. Typically British in its format, style and thoroughness is this book of mathematical physics. The word "advanced" in the subtitle of the book really means what it says.

Science News Letter, January 29, 1938

Chemistry

COLLATERAL READINGS IN INORGANIC CHEMISTRY—L. A. Goldblatt, ed.—*Appleton-Century*, 225 p., \$1.35. By a photo offset process are reproduced a valuable collection of additional readings from technical chemical magazines for any serious student of inorganic chemistry. Summaries of the lives and work of outstanding chemists, and significant chemical processes are given with a minimum of technical language or detail.

Science News Letter, January 29, 1938

Psychology

BEHAVIORISM AT TWENTY-FIVE—A. A. Roback—*Sci-Art*, 256 p., \$1.75. Behaviorism is 25 years old but no enthusiasm marked the anniversary. Dr. Roback, long opposed to behaviorism, celebrates by the issue of this critical volume.

Science News Letter, January 29, 1938

Political Science

EXPENDITURES OF THE FEDERAL GOVERNMENT—John A. Krout, ed.—*Acad. of Political Science*, 137 p., \$2.50.

Science News Letter, January 29, 1938